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(54) **Disposable single-use drip-fed device with a cover for the needle after use.**

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## Description

This invention concerns a disposable single-use drip-feed device with a cover for the needle after use.

The continuous spread of infectious diseases has meant that all invasive instruments used in treating patients are designed in such a way as to be rendered completely harmless once used.

This is particularly important for medical personnel who can easily injure themselves with objects which at first sight seem harmless.

This is the case with drip-feed devices consisting of a connector which couples with a tube supplying drip-feed liquid and of a needle linked together by a narrow tube. For handling, the needle is provided with a pair of flexible tabs diametrically opposite each other.

Before the drip-feed device is used, the needle is sheathed in a cap which is flush with the structure which the tabs are attached to.

Since the needle and the structure to which it is attached are very small so as to enable the needle to be inserted into the vein while almost in contact with and parallel to the skin, this cap must also be very small.

Consequently the cap is often lost immediately after it is removed from the needle, and in any case, it is difficult to replace it on the needle without running the risk of pricking oneself.

Immediate disposal of the whole device in a suitable container after use easily overcomes the problem of the risk of injury, but sometimes may be difficult to do when it is necessary to perform a number of tasks almost simultaneously and there is no time available to think about one's personal safety, as when the life of a patient may depend upon swift action being taken.

This aspect is even more serious if, as mentioned above, the patient is suffering from an easily transmitted infectious disease. Obviously, in the case of a drip-feed device the risk would be great, since the needle would spread contagion through an injury and not by mere contact.

To eliminate these problems, devices for the protection of winged needles have been proposed, such as for example the WO-A-9 003 196, issued April 5, 1990 Utterberg D.S. et al.

This application discloses a slotted cover for locking a winged needle in a shielded position. The cover is moved towards the needle point, the wings attached to the needle slide in the slots of the cover so that the needle is protected. As disclosed in this application the slots are opened in the opposite side of the needle point. With this system, therefore it is always possible the risk, even if a security system is provided, that, by moving the cover towards the needle point, the wings went out from the slots and the protection is lost. Besides in certain embodiments the

construction is rather complicated and not economical.

The aim of the present invention is to eliminate these drawbacks with a simple and economical construction.

The main feature of the present invention is that the slots are opened towards the needle point, so that, with the movement for protecting the needle, it is impossible that the wings went out from the slots. Another important feature of the present invention is that the extremities of the cover towards the needle point present two oblique surfaces in order to make sure the insertion of the tabs into the slots.

This invention, described in the claims below, solves the problem mentioned with a drip-feed device whose characteristics and advantages are explained in greater detail in the following description and in the diagrams enclosed, these being only one example of the invention and not to be interpreted as being in any way restrictive, in which:

- Figure 1 is an enlarged side view of the drip-feed device;
- Figures 2, 3 and 4 are enlarged plan views of the needle and the cap of the device in Figure 1 in three successive stages following use;
- Figure 5 is a side view in reduced scale of Figure 4 in which the device is ready for completely safe disposal and is illustrated in a different form. With reference to the enclosed figures the drip-feed device described in this invention comprises a connector 1 linkable to a feed tube supplying a drip-feed liquid and a needle 3 which are connected to each other by a narrow tube 2.

The connector 1, the narrow tube 2 and the needle 3 communicate and are irremovably joined together.

The needle 3 consists of a tubular structure 10 rigidly connected to the narrow tube 2 and fixed to the actual needle 11.

Two flexible tabs 4 for manipulating the entire needle 3 extend in diametrically opposite directions from the structure 10.

The drip-feed device in question is completed by a cap 12 which is designed to fit over the needle 11 and which touches the structure 10.

According to the present invention, over the narrow tube 2 is fitted, in a freely sliding manner, a tubular cover 5 which has, on the extremity 7 towards the needle 3, a pair of longitudinal slots 6 into and along which the tabs 4 of the needle 3 can be inserted.

The cover 5 and the slots 6 are of such a length that when the tabs 4 have run the whole length of the slots 6 and approach the closed ends of the latter, the needle 3 is completely housed within the cover 5.

The cover 5 must be made from a material which is sufficiently hard to prevent the needle 11 from piercing it, yet at the same time, sufficiently elastic to

permit easy insertion of the tabs 4 into the slots 6.

As can be seen in Figures 1 and 5, the two halves 8 of the extremity 7 of the cover 5 formed by the slots 6, are at an angle to the transversal plane of the cover itself. Practically the two halves 8 provide two guides for automatic insertion of the tabs 4 into the slots 6.

In Figure 1 it can be seen that if the connector 1 is moved away from the cover 5, the needle 3 is moved nearer to the cover 5. The tabs 4 can come into contact with the two halves 8 in any position, and thanks to their slant and the flexibility of the narrow tube 2, slide along the same because of the traction exerted on the latter (see Figure 1 arrow FS) and revolve around the axis of the needle 3 and of the cover 5 (see Figure 2 Arrow FR) until they are perfectly aligned with the slots 6 (see Figure 3). Subsequently the tabs 4 enter the slots 6 and move along them completely until the needle 11 is completely inside the cover 5 (see Figures 4 and 5). A further characteristic of the device according to the present invention is that the slots 6 are envisaged as forming, at their closed ends, a seat 9 which can house the tabs 4 in their entirety (see Figures 1 and 5).

Furthermore, the seats 9 are so shaped, where their extremities communicate with the slots 6, as to prevent the tabs 4 from leaving them. A design which suits this purpose is shown in Figure 5 where the seats 9 have rounded extremities and the slots 6 depart from them eccentrically with respect to the axis of the same seats 9 so as to divide these rounded extremities into two arcs of different width. In this way, any pressure on the tabs 4 with the intention of dislodging them from the seats 9 would make the same hit against only the wider arc. It must in fact be remembered that if the tabs 4 are completely lodged within the seats 9 and the cover 5 is elastic, the seats 9 allow the cover 5 to return to its initial position in which the two halves defined by the slots 6 are in mutual contact as shown in Figure 5. If the slots 6 and the seats 9 were coaxial, as shown by the dotted line in Figure 1, the tabs 4 could exert pressure on the two sides of each groove 6 and force them apart.

The drip-feed device described in the present invention fully reaches its aim, since after use it is sufficient to move the connector 1 and the cover 5 away from each other for the needle 11 to move completely inside the cover 5 thus preventing the needle 11 from protruding even slightly from the same cover.

The present invention has the advantage of being simple to manufacture and use, which makes it both extremely effective and easy and quick to use under all circumstances.

There is the further advantage that its cost is extremely low.

## Claims

1. Single-use drip-feed device with a cover for the needle after use, comprising, in this order, and communicating and irremovably joined together, connector (1) linkable to a feed tube supplying a drip-feed liquid, a narrow tube (2), and a needle (3) having two diametrically opposite flexible tabs (4) for handling, and further comprising a tubular cover (5) freely sliding over the narrow tube (2), said cover (5) has a pair of longitudinal slots (6); the said slots are of a length such that, when the said tabs (4), sliding into the said slots (6) approach the extremity of the said slots (6) which is towards the connector (1), the point of the needle (3) is completely contained within the said tubular cover (5), characterised in that the said slots (6) are opened at the extremity (7) of the cover towards the point of the needle and do not extend to the opposite extremity (9) and are on opposite sides with respect to its longitudinal axis, the two halves (8) into which the extremity (7) of the said tubular cover (5) is divided by the slots (6) are both at an angle to the transversal plane of the cover itself (5) thus forming two guides for the said tabs (4) for automatic insertion of the tabs (4) into the slots (6) when said connector (1) is moved away from the said tubular cover (5) after the use of the drip-feed device, and the said tubular cover (5) being made of a material which is sufficiently hard to prevent the point of the needle (3) from piercing it, yet at the same time, sufficiently elastic to permit insertion of the said tabs (4) into the said slots (6).
2. Drip-feed device as in claim 1, characterised in that the closed ends of the said slots furthest away from the said needle are shaped so as to form longitudinal seats (9) which, in the plane of section corresponding to the cylindrical surface of tubular cover (5), completely house the said tabs (4).

## Patentansprüche

1. Eine Wegwerf-einmal verwendbare Infusionsvorrichtung mit Kappe für die Nadel nach Verwendung, bestehend aus, in dieser Reihenfolge und fest miteinander verbunden, einem Verbindungsstück (1), das mit einem Schlauch, der Infusionsflüssigkeit zuführt, verbunden werden kann, einem engen Verbindungsschlauch (2) und einer Nadel (3) mit zwei, einander gegenüberliegenden, biegbaren Laschen (4), die die Handhabung ermöglichen, zudem einer hohlen, entlang des engen Schlauches leicht verschiebbaren Kappe (5) mit zwei längsgerichteten Schlitz (6), di

- so lang sind, daß, sobald die Laschen (4) in Richtung des Verbindungsstücks (1) in die Schlitz (6) eingeführt werden und das Ende der Schlitz (6) erreichen, die Spitze der Nadel (3) vollends von der Kappe umschlossen ist, wobei die Schlitz (6) einander in der Längsachse gegenüberliegen, an dem Kappenende (7), das näher bei der Nadelspitze liegt, offen sind, jedoch das andere Ende (9) nicht erreichen, und ferner die beiden, durch die Schlitz bedingten Hälften des Endes (7) der Kappe (5) in einem Winkel zum Querschnitt der Kappe (5) liegen, so daß sie, sobald das Verbindungsstück (1) nach Verwendung der Infusionsvorrichtung von der Kappe (5) entfernt wird, das automatische Einführen der Laschen in die Schlitz gewährleisten, und schließlich die Kappe (5) aus einem Stoff hergestellt ist, der von der Nadel (3) nicht durchstossen werden kann, der jedoch so elastisch ist, um die Einführung der Laschen (4) in die Schlitz (6) zu ermöglichen.
2. Eine Infusionsvorrichtung wie in Patentanspruch 1, wobei die geschlossenen Enden der Schlitz, die der Nadel am entferntesten liegen, so geformt sind, daß sie im Querschnitt der zylindrischen Fläche der Kappe (5) längsgerichtete Halterungen (9) bilden, die die Laschen (4) vollends umschließen.

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## Revendications

1. Un dispositif de perfusion à usage unique avec un capuchon pour l'aiguille après usage, qui comprend, dans l'ordre suivant, et communiquant entre eux et joints ensemble d'une façon inamovible, un raccord (1) qui peut être joint à un tube d'alimentation qui fournit le liquide de perfusion, un tube étroit (2), et une aiguille (3) ayant deux pattes (4) flexibles diamétralement opposées pour son maniement, et qui comprend en plus un capuchon tubulaire (5) qui glisse librement sur le tube étroit (2); ledit capuchon (5) a une paire de rainures longitudinales (6) dont la longueur est telle que, quand lesdites pattes (4), glissant dans lesdites rainures (6), s'approchent de l'extrémité desdites rainures (6) qui se trouve du côté du raccord (1), la pointe de l'aiguille (3) est entièrement contenue à l'intérieur dudit capuchon tubulaire (5),
- caractérisé en ce fait que lesdites rainures (6) sont ouvertes à l'extrémité (7) du capuchon qui se trouve du côté de la pointe de l'aiguille et ne se prolongent pas jusqu'à l'extrémité opposée (9) et sont sur les côtés opposés par rapport à son axe longitudinal, les deux moitiés (8) dans lesquelles l'extrémité (7) dudit capuchon tubulaire (5) est divisée par les rainures (6) sont toutes les deux à

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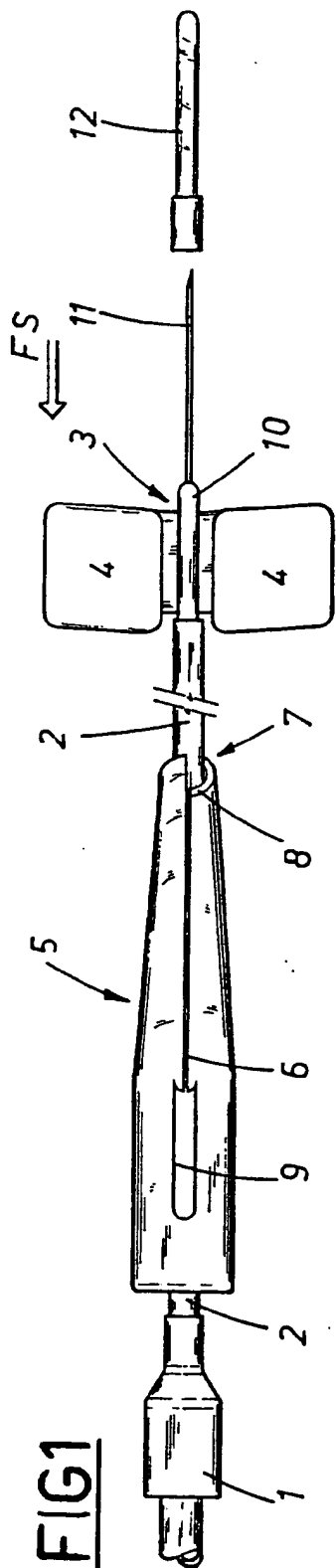
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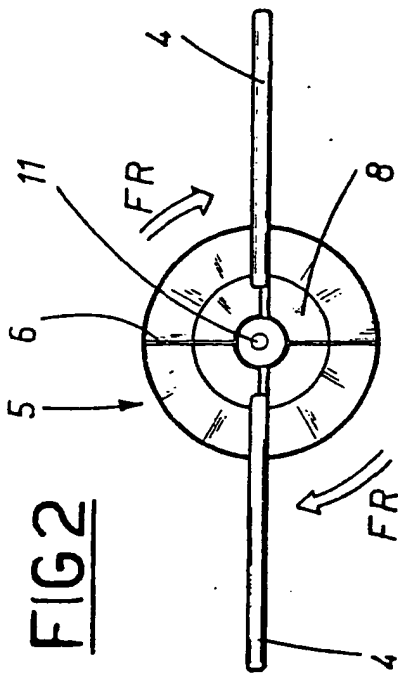
un angle vers le plan transversal du capuchon même (5) formant ainsi deux guides pour lesdites pattes (4) pour l'insertion automatique des pattes (4) dans les rainures (6) quand ledit raccord (1) est éloigné dudit capuchon tubulaire (5) après l'usage du dispositif de perfusion, et ledit capuchon tubulaire (5) étant fait en un matériau qui est suffisamment dur pour empêcher que la pointe de l'aiguille (3) ne le perce, tout en étant suffisamment élastique pour permettre l'insertion desdites pattes (4) dans lesdites rainures (6).

2. Un dispositif de perfusion comme celui de la revendication 1, caractérisé en ce fait que les bouts fermés desdites rainures encore plus éloignés de ladite aiguille sont façonnés de telle sorte qu'ils forment des sièges longitudinaux (9) qui, sur le plan de section qui correspond à la surface cylindrique du capuchon tubulaire (5), logent entièrement lesdites pattes (4).

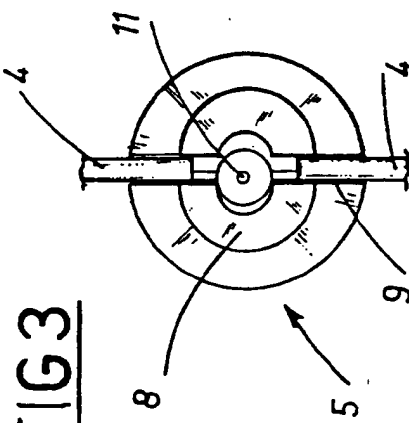
**FIG1**



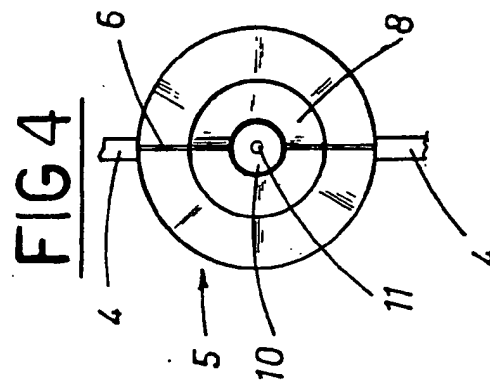
**FIG2**



**FIG3**



**FIG4**



**FIG5**

